



State of Utah
DEPARTMENT OF HEALTH
DIVISION OF ENVIRONMENTAL HEALTH

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March 24, 1989

Mr. R. J. Ramsey
Barney's Canyon Mine
P.O. Box 311
Bingham Canyon, Utah 84006-0311

Re: B.P. Minerals
Cyanide Heap Leach
Barney's Canyon Project
Construction Permit

Dear Mr. Ramsey:

We have reviewed the plans and specifications for the Barney's Canyon project prepared in accordance with the design criteria contained in Appendix A. We find them in agreement with the current review and approval criteria for heap leach facilities. A construction permit is hereby issued subject to the following conditions:

1. Any and all changes to the approved plans and specifications must be reviewed and approved by the Bureau of Water Pollution Control (the Bureau) prior to implementation.
2. Any variations to the concepts and details contained in the approved design criteria and plans and specifications for pad BC-1, must be submitted to the Bureau in writing for review and approval prior to implementation.
3. The facilities constructed under this permit must not be placed in service until the Bureau has inspected the same and authorized you in writing to do so.
4. The Bureau must be notified:
 - a. Three (3) days prior to beginning of any phase of pad or pond construction to schedule an inspection of completed work.
 - b. Two (2) months prior to commencing neutralization of any heap leach pad.
 - c. One (1) month prior to commencing construction of each pad except pad BC-1. The Bureau defines that construction has commenced with the laying of the six (6) inch leak detection base material or placement of materials that establish the physical dimensions of a process pond.
5. Prior to placing the project in service:
 - a. An approvable O&M manual covering topics such as routine operating procedures, maximum leaching solution application rate, handling of solutions, frequency and reporting requirements for monitoring the head on the flexible membrane liner, inventory of solutions in process ponds, and procedures for short term and long term shut down must be submitted for review and approval.

- b. An approvable contingency plan addressing the worst spill scenarios for this project and appropriate actions for containment, minimizing the damage and possible remedies, shall be submitted for review and approval.
6. A closure document shall be submitted for review and approval six (6) months prior to beginning of neutralization of any pads in the project.

The neutralization criteria shall be as adopted by the Utah Water Pollution Control Committee at the time of decommissioning, or as required in writing by the Bureau at the time of decommissioning, but in no case shall the neutralization criteria for this heap leach project result in degradation of the surface or groundwater quality including beneficial uses thereof in the vicinity.

A proposal outlining a study to evaluate neutralization procedure for the ore mined and leached at this site must be submitted within six months. The proposal must include demonstration of effectiveness of various neutralization procedures used on test columns at this site.

Neutralization of ore heaps based on the approved criteria must be verified in three (3) samples of heap leach pad rinsate reasonably spaced during a twenty-four (24) hour period. Procedure must be included in the neutralization plan for review and approval.

Verification of neutralization by analysis of the spent ore is waived on the condition that the spent ore piles will be left undisturbed and fenced for at least three (3) years once neutralized.

7. a. The project construction must be supervised by a full time qualified and independent inspector.
- b. Quality assurance tests must be conducted to insure compliance with the minimum requirements as stated in the approved specifications. A certified summary of results of such tests must be submitted for review within two (2) months of completion of each heap leach pad. Records of test results will be made available to state and county representatives during inspections. The quality assurance inspector must certify that the minimum specification requirements for each component of the pad and pond liner systems are met before construction of the next component begins.
- c. Any materials installed or used in construction which do not meet the minimum requirements must be replaced or mitigated to avoid any reduction in the life of the project.

8. These facilities constructed under this permit are authorized to be operated for a period of fifteen (15) years. Each heap leach pad is permitted to be operated for a period of ten (10) years from the date of authorization to commence operations. The life of the process ponds is ten (10) years from the date of authorization to commence operations. Additional operating life may be authorized up to fifteen (15) years following annual evaluations.
9.
 - a. B.P. Minerals shall drill and sample monitoring wells, furnish geophysical logs and the well construction data before authorization to initiate operations will be given.
 - b. A summary report of all monitoring well analysis will be submitted on a semi-annual basis. Any contamination observed in the wells must be reported to the Bureau by phone within 24 hours and in writing within seven days.
 - c. The wells which shall be monitored as part of this project are the city of Copperton wells, the well designated BC-148 and five (5) additional monitoring wells identified on Drawing 2-02-200 revision 8. These wells must be completed and monthly sampling started within thirty (30) days of the issuance of this construction permit. These wells shall be monitored to establish background information for calcium, magnesium, sodium, bicarbonate, sulfate, chloride, iron, manganese, copper, silver, gold, pH, total and free cyanide. These wells must be monitored bimonthly after sufficient background information has been established.
 - d. Any increase in parameters detected in samples from monitoring wells above established ground water background levels or variation of pH outside the range of 6.0 or 8.5 requires immediate notification of the Bureau, definition of the extent of the contamination and remediation and possible cessation of operations.
10. Construction of the lined reagent storage area at the east end of storage area A must not begin until details including drawing 3-06-6-1, have been reviewed and approved.
11. These heap leach pads are authorized for the leaching of oxide ore only.
12. These facilities must be under substantial continuous construction within one (1) year of the date of this permit. The approved schedule for construction completion for the pads is listed below:

<u>Leach Pad</u>	<u>Construction Completion Schedule</u>
BC-1	1989
M-1	1990
BC-2	1992
BC-3	1992
M-2	1994
BC-4	1994
future pad	1995

13. The operation of all heap leach pads shall be consistent with the design criteria and all agreements arrived at during the review process.
14. Detection of process solutions in the leak detection system is a sufficient justification for the Bureau to require an evaluation of the liner system for all pads covered by this permit which remains to be constructed.
15. Pad and pond flexible membrane liners must be protected from hooved animal damage by fencing during construction.
16. Potable water supply and domestic wastewater systems must be approved by the appropriate regulatory agency prior to initiating operations.
17. All heap leach pad sites, process solution ponds and the process area must be enclosed within an eight (8) foot chain link and barbed wire fence. Details must be submitted for review and approval before commencing construction of the same.
18. Process fluid monitoring devices must be installed in all heap leach pad lanes. Details must be submitted for review and approval before construction of monitoring devices commences.
19. Prior to discontinuing operations for the winter, the heap leach pads shall be drained so the maximum process fluid inventory in the process ponds is no more than 600,000 gallons.
20. Detail 8 on drawing 3-06-607 revision 0 which shows two (2) 36-inch silt retention berm spillway culverts discharging into the 36-inch overflow culvert, must be revised per JBR Consulting engineer's recommendation, i.e., discharge into a drop box instead of the closed pipe T arrangement shown.
21. The installation of the HDPE liner on the pads and in the ponds shall be done so that at minimum design temperature there will be minimal stress due to thermal contraction.

The project construction covered by this permit is as follows:

Process Piping

All process piping and transfer piping shall be contained within a lined trench or a secondary containment pipe. Provisions will exist for all containment piping and lined trenches to discharge leakage and spillage to the process ponds.

Process Plant

The process plant and reagent storage areas have concrete floors which slope to drains or sumps which will direct spillage or leakage to the process ponds. To acomodate a catastrophic failure in the process plant a portion of the building foundation containment wall top has been lowered to form a weir for spillage to flow into the barren solution by pass sump.

Process Ponds

The process ponds shall consist of two (2) ponds each having a volumetric capacity of over 5,400,000 gallons.

The total process pond capacity of 10,800,000 gallons is based on the following design assumptions:

Process fluid inventory	300,000 Gallons
Freeboard	1,712,000 Gallons
24 hour draindown*	2,312,000 Gallons
Precipitation falling into ponds	263,000 Gallons
Snow melt average design	<u>5,456,250 Gallons</u>
	10,043,250 Gallons

* The 24-hour drain down was allowed as a design criteria because there are 2 independant power generating facilities supplying power to the Barney's Canyon project. Also because of B.P. Minerals assurances that duplicate and spare pumps will be available for the Barren pond and Booster pump station capable of preventing a process pond discharge.

The pond liner system shall consist of:

- 60 mil HDPE primary liner
- 1 gpm per feet HDPE drainage net
- 8 oz per sq. yd. geotextile
- 12 inches of 1.0×10^{-7} centimeter per second clay

Adequate provisions are provided to divert surface runoff around the process ponds.

Heap Leach Pads

There are six (6) heap leach pads covered by this permit which will be constructed according to the schedule outlined in special condition No. 15. The heap leach pads are generally rectangular in configuration and are physically defined by the following dimensions.

<u>Leach Pad</u>	<u>Area</u>	<u>Ore Height*</u>
BC-1	35 acres	125 feet
M-1	23 acres	125 feet
BC-2	29 acres	125 feet
BC-3	30 acres	125 feet
M-2	7 acres	125 feet
BC-4	37 acres	125 feet
future pad	9 acres	125 feet
	170 acres total	

*Maximum

The heap leach liner system and the foundation has been designed to retain its integrity under the ore height authorized by this permit.

The pad liner system shall consist of the following:

- 3 foot thick process solution collection system (head < 12 inches)
- 60 mil HDPE Primary liner
- 12 inch minimum of 1.0×10^{-7} centimeters per second secondary clay liner
- 6 inch minimum 1.0×10^{-3} centimeters per second leak detection media
- 6 inch minimum 1.0×10^{-6} centimeters per second leak detection base.

The leak detection system will be divided into sections bounded on the downhill side by leak detection pipes in small trenches. Each leak detection pipe is capable of being monitored for leakage.

Each heap leach pad shall be surrounded by barrier mounds and drainage ditches to prevent surface runoff from entering.

Surface Runoff

Diversion ditches shall intercept and direct surface runoff around the heap leach pads and into a silt retention basin. It is understood that silt retention basins will be required on all future pad construction in drainages outside the one controlled by this silt retention berm.

The Bureau must base its acceptance of the "rough grading" construction done on pad BC-1 and the process pond only upon review of the quality assurance data, as no opportunity to inspect the construction was afforded.

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The Bureau requests that cost summaries of liner system components be provided for our information.

B.P. Minerals may be required to submit chemical information to state and other agencies under the federal emergency planning and community right to know act.

We are advising you that any increase in pH, lead, cadmium or cyanide in ground water or surface water above background level due to this project may cause the project to be listed on the national priority list of hazardous substance sites by EPA pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).

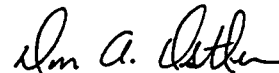
All wastes not exempt under the mining exemption must be managed in accordance with Utah's Hazardous Waste Management Regulations (i.e. spent solvents, off specification chemicals, undesirable metals in the leach solutions, etc.)

By copy of this letter to the Division of oil, Gas and Mining, we are requesting that the state mine inspector visit this mine site at least twice per year and inspect all leak detection sumps for these facilities.

Please call Mr. Mack Croft or Mr. Charlie Dietz of our staff if there are any questions.

Sincerely,

Utah Water Pollution Control Committee



Don A. Ostler, P.E.
Executive Secretary

CGD/ag
w/enclosures

cc: Ms. Cindy Emmons, B.P. Minerals

Mr. L.J. Jacobsen, Barney's Canyon Gold project

Mr. Kent Miner, Salt Lake City/County Health Department w/enclosure

Mr. Brian Buck, JBR Consultants

Mr. Lowell Braxton, Oil, Gas, and Mining

Mr. Ross Pino, 310 East State Highway, Copperton, Utah 84006

Mr. Steve Harris, Magna Area Elected Council, Magna, Utah 84044

Mr. Blaine Milner, Chairman, Copperton Improvement District, Copperton, Utah

Mr. William R. Thurman, 1200 Kennecott Building, Salt Lake City, Utah 84113

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Appendix A

The following is a list of design assumptions and criteria agreed upon, during the review process, that are part of the basis upon which the issuance of the Barney's Canyon construction permit was approved.

1. The leak detection base for the heap leach pad liner system shall be at least 6 inches thick, be free from pockets of sand and gravel and have a permeability of 1.0×10^{-6} centimeters per second or less.
2. Process solution collection system media shall be 3/4 inch minus.
3. The crushed and agglomerated ore will be loaded onto the pad with a stacker and will be 1 1/2 inch minus.
4. Longitudinal field seams in lined pipe trenches will be located on the trench sides.
5. Provisions will be in place to insure that surface runoff will not enter the lined pipe containment trenches.
6. Process reagents will only be stored in the lined area of storage area A.
7. The heap leach pad process solution collection system shall limit the head on the flexible membrane to 12 inches or less.
8. If bentonite addition is required to achieve the specified permeability rate for the secondary clay liner or leak detection base adequate mixing must occur to achieve uniformity.
9. The minimum ore set back from toe of ore to the retention berm surrounding the heap leach pad is 12 feet.
10. The portion of storage area A which will drain to the process ponds is 1.5 acres which will contribute 143,000 gallons during the design storm event.
11. The leak detection pipes will be slotted around their entire circumference. Slots are 1 inch long, 0.06 inch wide and are cut in the valley of the corrugations.
12. The desilting pond is designed to contain the 100-year 24-hour storm event from the upland watershed. The desilting pond spillway is designed to pass the peak flow from the 100-year 24-hour storm event. The overflow system is designed to handle the 100-year 6-hour storm event.
13. All grain-size-distribution excavations for clay liner material shall include a portion of the side wall being cut verticle for observing and evaluating the acceptability of clay remolding.
14. The crushed ore blanket on the flexible membrane liner shall consist of 3/4-inch minus agglomerated material.

15. All barren solution piping on the heaps will either be welded or have yelomine spline type connections.

The Bureau recommends that sand sized material be used to construct the process solution collection system to protect the flexible membrane. Your consultants, Sergeant, Hauskins and Beckwith recommends that a material passing through a $\frac{3}{4}$ -inch sieve should perform satisfactorily. The Bureau accepts this professional opinion subject to the fact that any damage observed will be mitigated.